

Closed Circuit Television Theory and Applications

Glossary of Terms

ACTIVITY DETECTION - A feature used in multiplexers that uses video motion detection techniques to improve the camera update times. It can also give a relay closure.

ANGLE OF VIEW - The angular range that can be focused within the image size. Small focal lengths give a wide angle of view, and large focal lengths give a narrow field of view.

APERTURE - The opening of a lens which controls the amount of light reaching the surface of the pickup device. The size of the aperture is controlled by the iris adjustment. By increasing the f stop number (*f1.4, f1.8, f2.8, etc.*) less light is permitted to pass to the pickup device.

ALARMING - The ability of CCTV equipment to respond to an input signal, normally a simple contact closure. The response varies depending on equipment type.

ASPECT RATIO - The ratio of the picture frame width to the picture frame height in standard TV systems. It is 4 units horizontal over 3 units vertical.

ASPHERICAL LENS - A lens designed with a non spherical shape so that it refracts the light passing through it to either lower the lens aperture so that it passes more light or decrease barrel distortion on wide angle lenses.

AUTOMATIC FREQUENCY CONTROL (AFC) - An electronic circuit used whereby the frequency of an oscillator is automatically maintained within specified limits.

AUTOMATIC GAIN CONTROL (AGC) - An electronic circuit used by which the gain of a signal is automatically adjusted as a function of its input or other specified parameter.

AUTOMATIC IRIS LENS - A lens in which the aperture automatically opens or closes to maintain proper light levels on the faceplate of the camera pickup device.

AUTOMATIC LEVEL CONTROL (A.L.C.) - A feature on Auto Iris lenses (also known as the peak/average control). Adjusting this control allows the auto iris circuitry to either take bright spots more into consideration (peak), bringing out detail in bright areas, or less into consideration (average) bringing out detail in shadows.

AUTO-TERMINATING - A feature where the equipment (ex. Monitor) automatically selects the correct termination depending on whether the video output BNC is connected.

AUTO WHITE BALANCE - A feature on color camera that constantly monitors the light and adjusts its colour to maintain white areas.

ATTENUATION - A decrease or loss in a signal.

BACK FOCAL DISTANCE The distance from the rear most portion of the lens to the image plane.

BLACK LEVEL - The level of the video signal that corresponds to the maximum limits of the black areas of the picture.

BACK LIGHT COMPENSATION(B.L.C.) - A feature on newer CCD cameras which electronically compensates for high background lighting to give detail which would normally be silhouetted.

BLANKING - The process of cutting off the electron beam in a camera pickup device or picture tube during the retrace period. It is a signal that is composed of recurrent pulses at line

and field frequencies. It is intended primarily to make the retrace on a pickup device or picture tube invisible.

BLOOMING - The halation and defocusing effect that occurs around the bright areas of the picture (highlight) whenever there is an increase in the brightness intensity.

BRIDGING - A term indicating that a high impedance video line is paralleled, usually through a switch, to a source of video.

"C" MOUNT/"CS" MOUNT - CCTV lenses are available in two different lens mounts. "C-mount" lenses have a flange back distance of *17.5mm vs. 12.5mm* for "CS-mount" lenses. Many of today's cameras can accept either type of lens, but it is important to make sure that camera and lens are compatible and set up properly. C-mount lenses can be used on CS-mount cameras by utilizing a 5mm adapter or adjusting the camera for C-mount lenses. Because of the shorter back focal distance, CS-mount lenses can only be used on CS-mount cameras. Your picture will be out of focus if you use a CS-mount lens on a C-mount camera.

C.C.D. (CHARGED COUPLED DEVICE) - A C.C.D. chip that is the pick up device on a camera, performing a similar function as a camera tube.

CONDITIONAL REFRESH - A technique used in slow and fast scan transmission equipment, where only small screen changes are transmitted. Up to a certain percentage of the on-screen picture can be updated before a full picture is required.

CANDLEPOWER - The unit measure of an incident light.

CCTV - The common abbreviation for Closed Circuit Television.

COATINGS - Light is lost by reflection from optical surfaces that are intended to be refractors only. This loss is effectively reduced by very thin coatings on the lens surfaces. This can be seen as a blue or violet hue on the lens surface.

COAXIAL CABLE - A type of cable capable of passing a range of frequencies with low loss. It consists of a hollow metallic shield in which one or more center conductors are put in place and isolated from one another and from the shield.

COLOR BURST - The portion of a composite video signal that comprises a few cycles of a sine wave of chrominance subcarrier frequency used to establish a reference for demodulating the chrominance signal.

COMPOSITE VIDEO - The combined video signal that includes the picture signal, the vertical and horizontal blanking and synchronizing pulses.

CROSSTALK - An undesired signal that interferes with the desired signal.

DB (DECIBEL) - A measure of the power ratio of two signals. It is equal to ten times the logarithm of the ratio of the two signals.

DC TYPE LENS - An auto-iris lens with internal circuit which receives voltage and a video signal from the camera to adjust the iris.

DEPTH OF FIELD - The front to back zone in a field of view which is in focus in the televised scene. With a greater depth of field, more of the scene, near to far, is in focus. Increasing the f-stop number increases the depth of field of the lens.

Therefore, the lens aperture should be set at the highest f-stop number usable with the available lighting. The better the lighting, the greater the depth of field possible. In other words, the depth of field is the area in front of the camera which remains in focus. The larger the f-number the greater is the depth of field.

DIGITAL - A signal that levels are represented by binary numbers.

DISTRIBUTION AMPLIFIER - A device that accepts a (video) signal and sends it out to a number of independent outputs.

DUPLEX (MULTIPLEXER) - A multiplexer that allows the user to look at multi-screen images while performing time multiplex recording.

DWELL TIME - The length of time a switcher holds on a camera before moving on to the next in sequence.

E.I. (ELECTRONIC IRIS) - Automatically changes a CCD camera's shutter to mimic Auto Iris control, allowing fixed or manual iris lenses to be used in a range of areas that used to require an auto iris lens.

E.I.A. (ELECTRONIC INDUSTRY ASSOCIATION) - US TV standard 525 lines 60 fields.

ELECTRONIC SHUTTERING - Electronic shuttering is the ability of the camera to compensate for moderate light changes in indoor applications without the use of auto iris lenses.

EQUALIZATION - The process of correcting losses of certain components in a signal.

EXTENSION TUBE - Kit consisting of various size spacers that are used between the lens and the camera to reduce the lens M.O.D. Generally used for very close-up applications. Not recommended for zoom lenses due to loss of tracking.

F-NUMBER - The f-number indicates the brightness of the image formed by the lens, controlled by the iris. A smaller f-number means a brighter image.

F-STOP - A term used to indicate the speed of a lens. The smaller the f-number, the greater is the amount of light passing through the lens.

FIBER OPTICS - Flexible glass fibers used to conduct energy. It is valuable in the coupling of multi-stage image intensifiers.

FIELD - One half of a frame, consisting of either the odd or the even numbered lines, 60 fields are transmitted every second.

FLANGE BACK - The distance from the flange of the lens (beginning of the lens mount) to the focal plane. C-mount lenses have a flange back distance of 17.526mm vs. 12.5mm for CS-mount.

FOCAL LENGTH - The distance from the center of the lens to a plane at which point a sharp image of an object viewed at an infinite distance from the camera is produced. The focal length determines the size of the image and the angle of the field of view seen by the camera through the lens. That is the distance from the center of the lens to the pickup device.

FOOTCANDLE - It is the light intensity (illumination) of a surface one foot distant from a source of one candela. It is equal to one lumen per square foot. (1FC = 1 lm ft²). The footcandle is the unit used to measure incident light.

FRAME - The total area of the picture which is scanned while the picture signal is not blanked.

FRONT PORCH - The portion of the composite video signal which lies between the leading edge of the horizontal blanking pulse and the leading edge of the corresponding synchronizing pulse.

GEN-LOCK - A method used to synchronize one or more cameras by external means such as: composite video, composite sync, horizontal or vertical sync.

GHOST - A shadowy or weak image in the received picture, offset either to the right or to the left of the primary image. It is the result of transmission conditions where secondary signals are created and received earlier or later than the primary signal.

GROUND - An electrical connection point that is common to either a metal chassis, a terminal, or a ground bus.

GROUND LOOP - Caused by different earth potentials in a system. Effects video pictures in the form of a black shadow bar across the screen or as a tearing in the top corner of a picture.

HI-Z (UNTERMINATED) - Video input of a piece of CCTV

equipment, wired so as to allow the video signal to be fed to further equipment. Does not necessarily include extra sockets for the extra coaxial cables.

HORIZONTAL BLANKING - The blanking signal that is produced at the end of each scanning line.

HORIZONTAL (HUM) BARS - Horizontal bars, alternately black and white, which extend over the entire picture. They are known as venetian-blinds. They may be stationary or move up or down. They are often caused by approximately 60 Hertz interfering frequency or its harmonic frequencies.

HORIZONTAL RESOLUTION - The maximum number of individual picture elements that can be distinguished in a single scanning line.

IMAGE SIZE - Reference to the size of an image formed by the lens onto the camera pickup device. The current standards are: 1", 2/3", 1/2" and 1/3" measured diagonally.

IMPEDANCE - The opposition which a circuit or component offers to the flow of electric current. It is expressed in ohms and is equal to the ratio of the effective value of the voltage applied to the circuit to the resulting current flow. In A.C. circuits, the impedance is a complex quantity that includes both resistance and reactance. In D.C. circuits, it is purely resistive.

INCIDENT LIGHT - The light that is falling directly over an object.

INSERTION LOSS - The signal strength loss that occurs when a piece of equipment is inserted into a line.

INTERLACE - A scanning process where every other horizontal line is scanned in one field while the alternate lines are scanned in the next field to produce a complete picture frame.

INTERLEAVING - A method used in alarms or activity detection which allows extra frames of video from alarmed cameras to be added to a time multiplexed sequence whilst a state of alarm exists.

I.S.D.N. (INTEGRATED SERVICES DIGITAL NETWORK) - Digital phone lines that allow transmission of video signals via fastscan at speeds of 128Kb/second; used with terminal adapters.

LAG - The image retention of an object after the object has been scanned. Sometimes, it causes smearing effect.

LEVEL CONTROL - Main iris control. Used to set the auto-iris circuit to a video level desired by the user. After set-up, the circuit will adjust the iris to maintain this video level in changing lighting conditions. Turning the control towards High will open the iris, towards Low will close the iris.

LINE LOCK - To synchronize the field sync pulses, of an AC powered camera, to the frequency of the voltage input (line voltage).

LOOPING - A term indicating that a high impedance device has been permanently connected in a parallel to a video source.

LUX - A unit of measuring the intensity of light. (1 FC = 10 lux).

MANUAL IRIS LENS - A lens with a manual adjustment to set the iris opening (F stop) in a fixed position. Generally used for fixed lighting applications.

MATRIX SWITCHER - A switcher able to route any of its (camera) inputs to any of its (monitor) outputs, they often include telemetry control.

MECHANICAL FOCUS (BACK-FOCUS) - The mechanical aligning of the imaging device with the focal point of the lens; it is most important on zoom lenses to be sure the image stays in focus throughout the zoom range.

MINIMUM OBJECT DISTANCE (M.O.D.) - The closest distance a given lens will be able to focus upon an object. This is measured from the vertex (front) of the lens to the object. Wide angle lenses generally have a smaller M.O.D. than large focal length lenses.

MODULATE - To change or vary some parameter such as varying the amplitude of a signal for amplitude modulation or the frequency of a signal for frequency modulation. The circuit which modulates the signal is called a modulator.

MONOCHROME - Having only one color. In television it is black and white.

MONOCHROME SIGNAL - In monochrome television, a signal for controlling the brightness values in the picture. In color television, the signal which controls the brightness of the picture, whether the picture is displayed in color or in monochrome.

N/D (NEUTRAL DENSITY) FILTER - A filter that attenuates light equally over the whole visible spectrum.

NOISE - Random spurts of electrical energy or interference.

NTSC - National Television Systems Committee that worked with the FCC in formulating the standards for the United States color television system.

PASSIVE - A non powered element of a system.

PEAK-TO-PEAK - The amplitude difference between the most positive and the most negative excursions of a signal.

PINHOLE LENS - Lens used for applications where the camera/lens must be hidden. Front of lens has a small opening to allow the lens to view an entire room through a small hole in a wall.

POWER - The rate at which electrical energy is applied to or taken from a device. It is expressed in terms of watts, milliwatts or microwatts.

PRE-POSITION LENSES - Zoom lenses which utilize a variable-resistor (potentiometer) to indicate zoom/focus position to the lens controller. After initial set-up, this allows the operator to view different pre-set areas quickly without having to re-adjust the zoom and focus each time.

RANDOM INTERLACE - A scanning technique commonly used in CCTV systems in which there is no external control over the scanning process. That is, there is no fixed relationship between adjacent lines and successive fields.

RANGE FINDER - Used to determine the focal length needed and what the picture will look like on the monitor. The user looks through the device and adjusts the range finder to the desired picture. Numbers on the outside of the range finder indicate the focal length needed.

RASTER - The rectangular pattern of scanning lines upon which the picture is produced. The illuminated face of the TV monitor without the video information present.

REFLECTED LIGHT - The scene brightness or the light being reflected from a scene. Usually it represents 5 to 95 percent of the incident light, and it is expressed in foot-lamberts.

RESOLUTION - A measure of the ability of a camera or television system to reproduce detail. That is the number of picture elements that can be reproduced with good definition. It is a factor of the pickup device or the TV CRT characteristics and the video signal bandwidth.

RETAINED IMAGE (IMAGE BURN) - A change produced in or on the target of the pickup device which remains for a large number of frames after the removal of a previously stationary light image and which yields a spurious electrical signal that corresponds to that light image.

RADIO FREQUENCY (R.F.) - Signals with a repetition rate above audible range, but below the frequencies associated with heat and light.

ROLL - A loss of vertical sync which causes the picture to move up or down on the TV screen.

RS232 - A commonly used computer serial interface.

SATURATION (COLOR) - The vividness of a color. It is directly

related to the amplitude of the chrominance signal.

SCANNING - The rapid movement of the electron beam in a pickup device of a camera or in the CRT of a television receiver. It is formatted in a line-for-line manner across the photo sensitive surface which produces or reproduces the video picture. When referred to a video surveillance field, it is the panning or the horizontal camera motion.

SENSITIVITY (PICKUP DEVICE) - The amount of current developed per unit of incident light. It can be measured in watts with the projection of an unfiltered incandescent source of light at 2870 K degrees to the pickup device surface area. It can be then expressed in footcandles.

SIGNAL TO NOISE RATIO - The ratio between a useful video signal and unwanted noise.

SIMPLEX (MULTIPLEXER) - A multiplexer that allows the user to look at multi-screen images or perform time multiplex recording. It cannot record multiplexer pictures while showing multi-screen pictures.

SPOT FILTER - A small insert used in a lens to increase the f-stop range of the lens.

S/N (SIGNAL TO NOISE) RATIO - Measure of noise levels of a video signal: the higher the number the better.

SUPER.V.H.S. (SUPER VIDEO HOME SYSTEM) - A new format of high resolution VHS video recorders, capable of giving greatly improved picture if all features and special tapes are used. VHS compatible.

SYNC - Electronic pulses that are inserted in the video signal for the purpose of assembling the picture information in the correct position.

TEARING - A picture condition in which horizontal lines are displaced in an irregular manner.

TELEMETRY - A system utilizing "control code" transmitters and receivers - They can use either video cable or a simple twisted pair cable to send their information.

TERMINATION - A non-inductive resistor that has the same resistance as the characteristic of the cable being used.

TIMEBASE CORRECTOR (T.B.C.) - An electronic circuit that aligns unsynchronized video signals before signal processing. Used in multiplexers and quad splitters.

TRACKING - A zoom lens' ability to remain in focus during the entire zoom range from wide angle to telephoto position.

VERTICAL INTERVAL - The time of vertical retrace.

VERTICAL RETRACE - The return of the electron beam to the top of a television picture tube screen or a camera pickup device target at the completion of the field scan.

VIDEO MOTION DETECTION - A system that uses the video signal from a camera to determine if there is any movement in the picture and set of an alarm.

VIDEO TYPE LENS - An auto-iris lens without an internal circuit to control the iris. All iris control voltages come from a circuit located within the camera.

VIDICON - A common type of camera pickup tube. It translates the effect of light striking its photo-sensitive surface into electrical impulses.

ZOOM LENS - A lens system that may be effectively used as a wide angle, standard or telephoto lens by varying the focal length of the lens.

ZOOM RATIO - The ratio of the starting focal length (wide position) to the ending focal length (telephoto position) of a zoom lens. A lens with a 10X zoom ratio will magnify the image at the wide angle end by 10 times.